Stakeholder SENTINEL

Aeronautical Systems Center,
Acquisition Environmental, Safety
and Health Division

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Scientists test fish tissue from Fort Worth lake

Residents concerned about fishing in a Fort Worth, Texas, lake were briefed in May on the potential hazards of eating fish from the lake.

The results of a fish tissue sampling project and a follow-on fish consumption advisory were primary topics of the well-attended Air Force Plant 4/Carswell Restoration Advisory Board (RAB) meeting, which normally concentrates on cleanup activities at the plant and base. However, community concerns about the fish advisory for Fort Worth's Lake Worth prompted the U.S. Geological Survey (USGS) and the Texas Department of Health (TDH) to attend and discuss details of the recent fish sampling project.

The USGS began the fish tissue-sampling project at Lake Worth in March 1999 at the request of the Aeronautical Systems Center's Environmental, Safety and Health Division, Wright-Patterson AFB, Ohio. In response to an earlier uncertain finding identified in the Public Health Assessment for the AFP 4 area, the USGS collected at least 10 samples of each species of edible fish from the lake, and tested the tissues for contamination. Test results provided valuable information to the officials involved in AFP 4's environmental cleanup and a word of caution for the communities around the lake.

Technicians from the U.S. Geological Survey use "electrofishing" techniques to gather specimens from Lake Worth for tissue testing.

The USGS National Water Quality Laboratory analyzed the samples for trace metals and certain organic compounds, and concluded that no significant amounts of metals or trichloroethylene (TCE) were found in the fish tissues. TCE is the primary chemical of concern in AFP 4's cleanup program. The analysis did indicate, however, that the tissues contained polychlorinated biphenyls, or PCBs.

The TDH analyzed the test results and agreed that the tested tissues contained little or no contaminants harmful to public health, with the exception of the PCBs. PCBs are industrial compounds once used in lubricants, transformers and electrical capacitors. Although banned in 1979, PCBs can persist for years and do not readily dissolve in water. They pose no risk to the water supply since they tend to sink to the bottom of bodies of water and mix with the sediments. Bottom-feeding fish, such as carp and catfish, ingest the compounds, allowing PCBs to settle in their tissues.

The TDH, exercising its authority under the Texas Health and Safety Code, issued a consumption advisory in May. After reviewing the data, officials submitted a health consultation to explain the risk of consuming fish from Lake Worth. As part of the findings in this risk assessment, the TDH looked at both cancer and non-cancer effects from long term consumption of the fish. The TDH concluded that the PCBs in the fish tissues did not exceed the criteria for issuing a fish consumption advisory due to cancer effects. However, the TDH recommends that people should not consume fish from Lake Worth, due to the possibility of increased risk of non-cancer effects of PCBs, such as a type of skin disorder called "chloracne," high blood pressure, gastric ulcers, anemia, and liver problems.

Mike Ordner, assistant director for the TDH's Seafood Safety Division, stated

*(See **Advisory**, page 3)*

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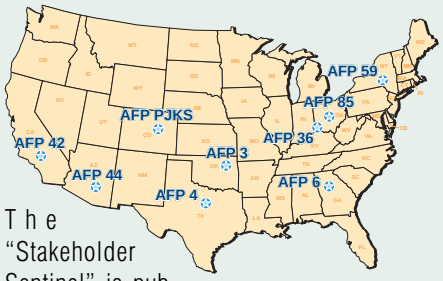

The "Stakeholder Sentinel" is published to provide community members with up-to-date information on environmental activities at Air Force industrial plants. The Aeronautical Systems Center (ASC), Acquisition Environmental, Safety and Health Division at Wright-Patterson AFB, Ohio, manages the cleanup at nine plants, called Government-Owned, Contractor-Operated facilities, located across the United States. This Air Force newsletter is an authorized publication of the Aeronautical Systems Center. The intent of this publication is to report on environmental activities and programs taking place at the nine industrial plants. Contents of the "Stakeholder Sentinel" are not necessarily the official views of, or endorsed by, the U.S. Government, the Department of Defense, or the Air Force. "Stakeholder Sentinel" is published under contract with IT Corporation, a private firm in no way connected with the U. S. Air Force. Editorial content is edited, prepared and provided by the environmental staff of ASC Office of Public Affairs. For more information, call 1-800 982-7248, ext. 322, 346, or 301. Or, visit our home page at:

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Community Activities CALENDAR

Air Force Plant 4, Fort Worth, Texas
- Restoration Advisory Board Meeting, Nov. 2, 2000; 6 - 8 p.m., Desert Storm Conference Center, Bldg. 2570 NAS Fort Worth JRB.

Air Force Plant 42, Palmdale, California
- Cleanup site tour for Environmental Restoration Advisory Board members, Dec. 12, 2000.
- Environmental Restoration Advisory Board Meeting, Dec. 13, 2000; 6:30 p.m., Antelope Valley Inn, Lancaster, Calif.

Air Force Plant 6, Marietta, Georgia
- Partnership Conference Meeting, Jan. 9, 2001; 9 - 11:30 a.m., Lockheed-Martin Credit Union Building, Marietta, Ga.

Air Force Plant 44, Tucson, Arizona
- Unified Community Advisory Board Meeting, Nov. 15, 2000; 6:30 p.m., El Pueblo Neighborhood Center, Tucson, Ariz.

Air Force Plant PJKS, Waterton, Colorado
- Restoration Advisory Board Meeting, Jan. 9, 2001; 6:30 p.m. Columbine Library, Littleton, Colo.

Editors Note: The above dates are subject to change. For the latest updates, look for notices on meetings and other events in your local newspaper or through direct mailings to your home. For more information, call 1 (800) 982-7248, ext. 322.

Spotlight On: Restoration Advisory Boards

New UCAB co-chairs named

Co-chairs for the Unified Community Advisory Board changed recently. The board represents community interests concerning cleanup of Plant 44 and the Tucson International Airport Area Superfund site. Ignacio G. Gomez was elected as the new community co-chair, replacing Dr. Tom Stubblefield. Eugenia Chow is the government co-chair, representing the U.S. Environmental Protection Agency, Region IX office. Chow replaces Sean Hogan, also with EPA, who held the government co-chair position since 1999.

Gomez was elected co-chair by the UCAB in May. He grew up in Tucson and is a graduate of Sunnyside High School, near Air Force Plant 44 on the south side. A retired union ironworker, Gomez now divides his time among several community organizations, including the Department for the Developmentally Disabled and a campaign for a candidate running for county office. He is active in the Diablo Village neighborhood watch program, enjoys fishing in the White Mountains and watching sporting events. Gomez has political aspirations for himself, considering running for a city or a county seat in a future election.

Chow has been a Superfund project manager at EPA for seven years. For the first three years she worked in the Region V office in Chicago. She transferred to the EPA Region IX San Francisco office in 1997 and is currently a project manager in the private sites/Department of Energy section of the Superfund Division. While working in the San Francisco office, she has managed the investigation and cleanup of several large, area-wide, groundwater sites involving multiple potentially responsible parties in both southern California and Silicon Valley. These sites have included the Puente Valley operable unit of the San Gabriel Superfund site and the Middlefield-Ellis-Whisman Study Area which contains the Fairchild, Raytheon and Intel Superfund sites.

Gomez said that he hopes to get more people interested in the UCAB and to maintain the board as the prominent and prestigious organization that it has become. "I want to keep the UCAB at the highest level of community involvement and provide help to the southside Tucson residents affected by the TCE plume," he said.

AFP 44 completes cleanup at former disposal site

Plant 44 engineer, John Adams, takes a soil vapor sample at Site 1 to determine the levels of contamination in the soil.

A project to remove contamination from soil has been completed at one of several cleanup sites at Air Force Plant 44 in Tucson, Ariz.

Known as the Ranch Site, the former hazardous waste disposal area had contained the cleaning solvent trichloroethylene (TCE), paint sludge and other materials, which were removed in accordance with state of Arizona cleanup standards.

Completion of the project brings the Tucson plant — built in 1951 to manufacture the Falcon missile — one step closer to restoring each of its 12 cleanup sites. Managed here by Aeronautical Systems Center's Acquisition Environmental, Safety and Health Division, the Plant 44 cleanup effort is part of the Tucson International Airport Area Superfund site and involves removing primarily TCE and other contaminants from the groundwater and soil.

Work to remove TCE at the 32-acre Ranch Site began in 1996 and cost an estimated $1,230,000 to complete. The work involved installation of a soil vapor extraction system to pull contaminant vapors from the ground using a network of extraction wells. Soil vapor extraction, or SVE, was selected by Air Force engineers as the optimum technology for restoring the site, which is explained in the official 1997 Record of Decision document. The system operated at the Ranch Site until last year, when samples were taken to determine how much TCE remained in the soil.

According to Dennis Scott, integrated product team lead for Plant 44, ASC Acquisition Environmental, Safety and Health Division, most of the extraction wells sampled showed no detection of contaminants. "At that point, we shut the system down for one full year of monitoring to determine if the contaminant levels would increase," he explained.

At the end of the monitoring period, additional soil and groundwater samples were collected to verify that the site was clean. "We detected a small area of contaminant vapors in one extraction well, so we continued operating the SVE system in that zone for several more months," Scott explained.

In January 2000, the area was sampled again, and no contamination was detected.

"Contaminant levels have been reduced substantially and are not expected to impact the groundwater in the future," said Scott. Over the course of the project, roughly 6,800 pounds of contaminant vapors were removed by the SVE system.

A report describing the site closeout process, titled "Final Remedial Action Completion Report for IRP Site 1," was prepared by the Air Force and submitted for review in September to the Environmental Protection Agency and Arizona Department of Environmental Quality. Once the report is approved, the site will be monitored annually and further evaluated during five-year reviews in accordance with federal environmental regulations.

- By Larine Barr
ASC Public Affairs

Advisory ----------
(Continued from page 1)

that a consumption advisory is not a ban and does not carry the force of law. "This does not mean people cannot eat fish from Lake Worth; we are simply offering advice against doing so." Ordner added that the TDH has banned fishing in other lakes in the Fort Worth area.

According to Ted Grady, ASC's integrated product team lead for AFP 4, the test results are valuable for the Plant 4 team. "We were looking for contamination from the plant, such as metals and TCE. This testing completes the public health assessment and indicates that the plant itself does not pose a current risk to human health or the environment." Grady added that the Plant 4 team intends to cooperate with the TDH and the city of Fort Worth as soon as their future actions regarding the PCBs in Lake Worth are decided.

USGS officials noted that PCB contamination could originate from anywhere that electrical power was used prior to the 1980s. The PCBs could have come from any landfills and industrial facilities around Lake Worth or from the atmosphere, based on contaminant levels found throughout the lake. The USGS pointed out that PCBs are present in every body of water in the area. Grady said the last PCB-regulated item at AFP 4 was removed in 1988. "PCB contaminated soil found at Plant 4 was over one-half mile from Lake Worth. The soil was excavated and transported to an EPA-approved disposal site."

In the meantime, the Air Force is contracting with the USGS to begin a round of sampling of the sediments in the lake. Scheduled to begin this fall, the sampling should more accurately define the extent of the PCB contamination and help determine its sources.

- By Daniel Johnson,
ASC Public Affairs

ASC boosts groundwater cleanup at AFP 4

Groundwater cleanup at Air Force Plant 4 (AFP 4) in Fort Worth, Texas, is well into the final phases, but the Air Force, in an effort to cut costs and improve results, is upgrading an existing system.

AFP 4 is an operating, military aircraft-manufacturing facility located near Fort Worth, Texas, adjacent to the Naval Air Station Fort Worth Joint Reserve Base (the former Carswell Air Force Base). Lockheed Martin Aeronautics Company currently operates the 760-acre facility, producing the F-16 Falcon and components for the new F-22. The Environmental, Safety and Health Division of Aeronautical Systems Center's Engineering Directorate, at Wright-Patterson AFB, Ohio, manages the plant and its environmental cleanup programs.

A worker installs groundwater extraction well piping and wiring in the east parking lot area at Plant 4 as part of the upgrade to the groundwater treatment system.

Through a contract with an engineering firm in Fort Worth, the Air Force is upgrading an existing groundwater "pump and treat" system in the east parking lot area of AFP 4. The pump-and-treat system pumps contaminated water out of the ground and removes the contamination, in this case a solvent called trichloroethylene. The present system, installed in 1993 and expanded in 1995, extends through the aircraft engine run-up area near the east side of the plant facility. The new upgrade is designed to remove contamination from groundwater more efficiently, to meet requirements described in the Record of Decision (ROD). The ROD is a document that outlines how the environmental cleanup will be accomplished.

The new system expands and modifies the existing extraction well field and existing treatment system to provide additional capacity and higher flow rate. The combined groundwater pump-and-treat and hydraulic control system will extract groundwater from 52 wells. Eight of these wells are currently-operating extraction wells, three are existing wells without pumps and piping to the system, and 41 are new. The wells will be situated in the area east of the main manufacturing building, extending through the parking lot toward the engine run-up area. George Walters, ASC's restoration program manager for the plant, said that the new wells were drilled while the plant was installing an upgrade to the fire suppression system for the engine run-up buildings, to minimize disruption to that facility.

The new treatment system incorporates most of the components of the existing system. These items include an equalization tank, bag filters, an air stripper to remove contamination from the water, a liquid-phase carbon-polishing skid to clean the wastewater from the air stripper, and some of the existing piping, instrumentation, and controls. Most of the existing two-inch piping will be replaced with three-inch piping to accommodate the higher flow rate. According to Walters, using existing equipment offsets a lot of the cost.

To minimize air-stripper clogging, groundwater will flow through a system designed to adjust the water's acidity, and then through a parallel train of bag filters, sized to allow operation of one filter at a time. This system permits maintenance and filter bag change-out without the need to take the filter system out of operation.

After filtration, a process called "liquid-phase carbon-polishing" will treat wastewater from the air stripper. This process provides an additional level of assurance for meeting discharge standards in the event that the air stripper is not functioning properly.

Air stripping is included in the process to remove volatile organic compounds (VOCs) from groundwater. Existing blower drives are being replaced during construction of the system to reduce the blower speed and airflow rate.

The new system includes construction of a pre-engineered metal building to house the new and existing equipment and an existing containment structure. The building will be heated and ventilated with an air-conditioned, insulated room to house the control system and computer. Plans for the new building include a chain-operated monorail and hoist to facilitate maintenance of larger equipment, and a truck bay for loading and unloading materials and equipment. The building's fire suppression and alarm system will be tied in to the main fire-control panel for the plant. In addition, an acid-storage tank area in the building will be provided with a separate containment wall to contain acid in case a leak or spill occurs.

Walters said that the east parking lot groundwater pump and treat system will be automated to the extent necessary to allow unattended, continuous operation. "We're doing a good job of minimizing costs of this upgrade by using existing equipment and automation," he said. "The overall result will be faster and better cleanup for less. That's what it's all about."

-By Dan Johnson
ASC Public Affairs

Workers set up a drill rig during the remedial investigation at Plant 42 to collect a water sample at a well head.

Environmental probe moves forward at AFP 42

- By Larine Barr, ASC Public Affairs

A variety of investigations to evaluate soil and groundwater contamination at Air Force Plant 42 in Palmdale, Calif., were completed this summer for 14 of the plant's 27 cleanup sites. Based on the results, the investigation found that there were "no unacceptable human health or ecological risks" for 11 of the 14 sites.

"These 11 sites don't contain contamination levels that will impact the soil or groundwater," explained George Warner, remedial project manager for Air Force Plant 42, Aeronautical Systems Center (ASC), Acquisition Environmental, Safety and Health Division. "As a result, we are recommending, pending approval by our environmental regulators, that no further action be taken at these specific sites."

The investigation, managed by ASC's Acquisition Environmental, Safety and Health Division, was conducted as part of the remedial investigation phase of the plant's ongoing Installation Restoration Program. The tests included groundwater sampling, soil gas surveys, and shallow soil and deep soil investigations – conducted over a two-year period.

During the shallow soil investigations, technicians collected samples from zero to 10 feet below the ground surface. The deep soil samples extended to depths of nearly 400 feet — reaching down to the water table. All of the samples were analyzed for volatile organic compounds, such as the solvent trichloroethylene (TCE), while select sites were tested for metals, semi-volatile organic compounds and petroleum hydrocarbons.

Investigation of the 14 sites also included a human health and ecological risk assessment to evaluate current and potential future risks to industrial workers and the environment. Human health assessments studied both cancer and non-cancer risks to which a person might be exposed from the air, soil and groundwater at each of the sites.

The areas where no further cleanup is being proposed include former disposal sites, and locations where fuel run-up and fire training operations occurred. Warner said the other three areas – Sites 5, 6 and 18— were found to have levels of contamination that warrant additional study.

"At Site 5, we plan on conducting more groundwater sampling at one of the wells that was not included in the initial study. We are also concerned about the potential problems with pesticides and PCBs (polychlorinated biphenyl) found in the shallow soil at Site 6 - concerns that will need to be addressed in the next stage of the cleanup process," Warner explainrd.

The next phase, called a Feasibility Study, will evaluate cleanup alternatives for Site 6, to include removing the contaminated soil or taking "no further action."

The investigation at Site 18 will be continued to locate the source area of TCE detected in both deep soil and soil vapor samples at the site. Warner said monitoring wells will be installed down gradient from Site 18 to determine if the site is impacting the groundwater.

"We are concerned about the TCE and consequently plan to install an additional three monitoring wells — in strategic locations — to pinpoint the extent of the TCE in the northwest corner of the plant," Warner said.

For the remaining 13 sites not yet characterized, Warner said fieldwork is expected to be completed by the end of the year to learn more about the contamination in those areas. Most of the 13 sites contain fuel and other materials discharged or spilled during past operations.

Air Force Plant 42 is a government-owned, contractor-operated facility, which traces its beginnings to 1935, when an airstrip was used as a bivouac site for squadrons. During its 50 years of operation, AFP 42 has produced, flown and modified an array of aircraft such as the F-100, F-104, SR-71 and B-2.

Technicians decontaminate soil sampling equipment at Site 6, one of several sites evaluated during the remedial investigation.

Microtunneling at Air Force Plant 6

- By Don Yates ASC Public Affairs

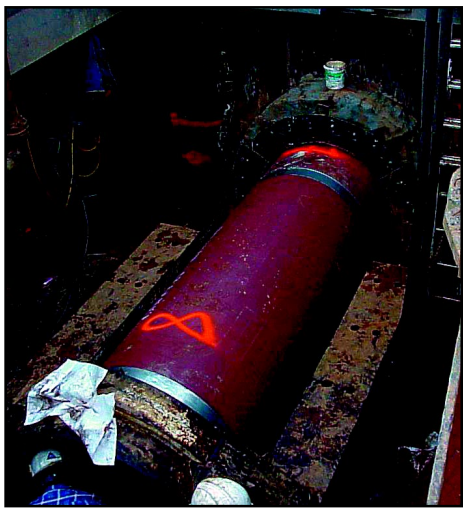
Imagine being tasked to install a buried pipeline in Vienna, Austria. This is a fragile area with buildings well over 800 years old, many of which are slowly sinking.

Conventional trenching and laying of pipeline would be risky and expensive. But a new technology called microtunneling is now being used to solve this type of problem, both abroad and here in the United States.

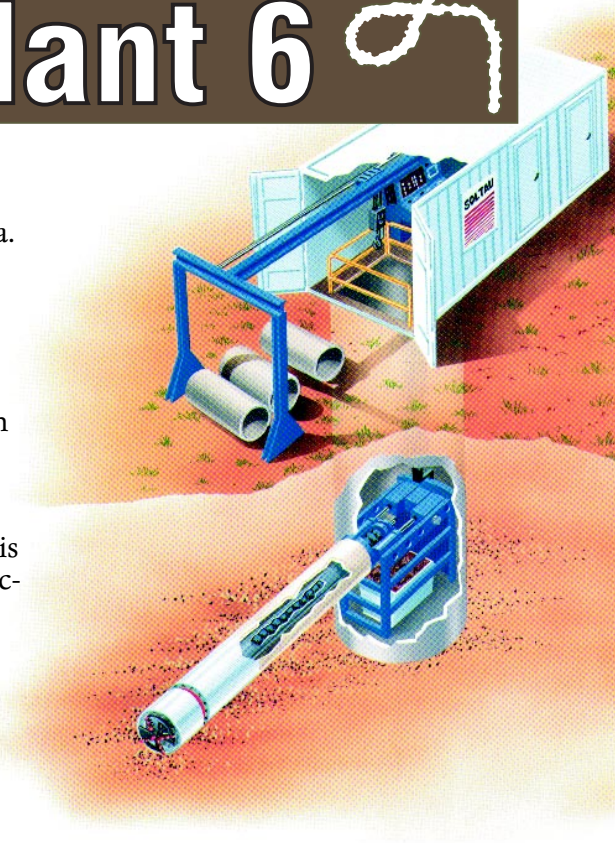
Meeting the challenge

At Air Force Plant 6 (AFP 6) in Marietta, Ga., the Air Force is meeting challenges similar to those found in Vienna. A microtunneling project is replacing an aging storm water pipeline that runs 1,200 feet beneath underground utilities, roads, buildings and an electric power substation. Leakage from the pipeline, made of concrete and corrugated metal pipe, may be contributing to groundwater contamination in the area. This is due to an old pipeline experiencing corrosion and failure.

Capt. Thomas Hamrock, Aeronautical Systems Center's (ASC) compliance project manager for AFP 6, said that the components of the system make microtunneling effective and unobtrusive. "I saw a microtunneling operation last December in Vienna and was very impressed. This justified the risk of considering this approach versus tradional construction methods."

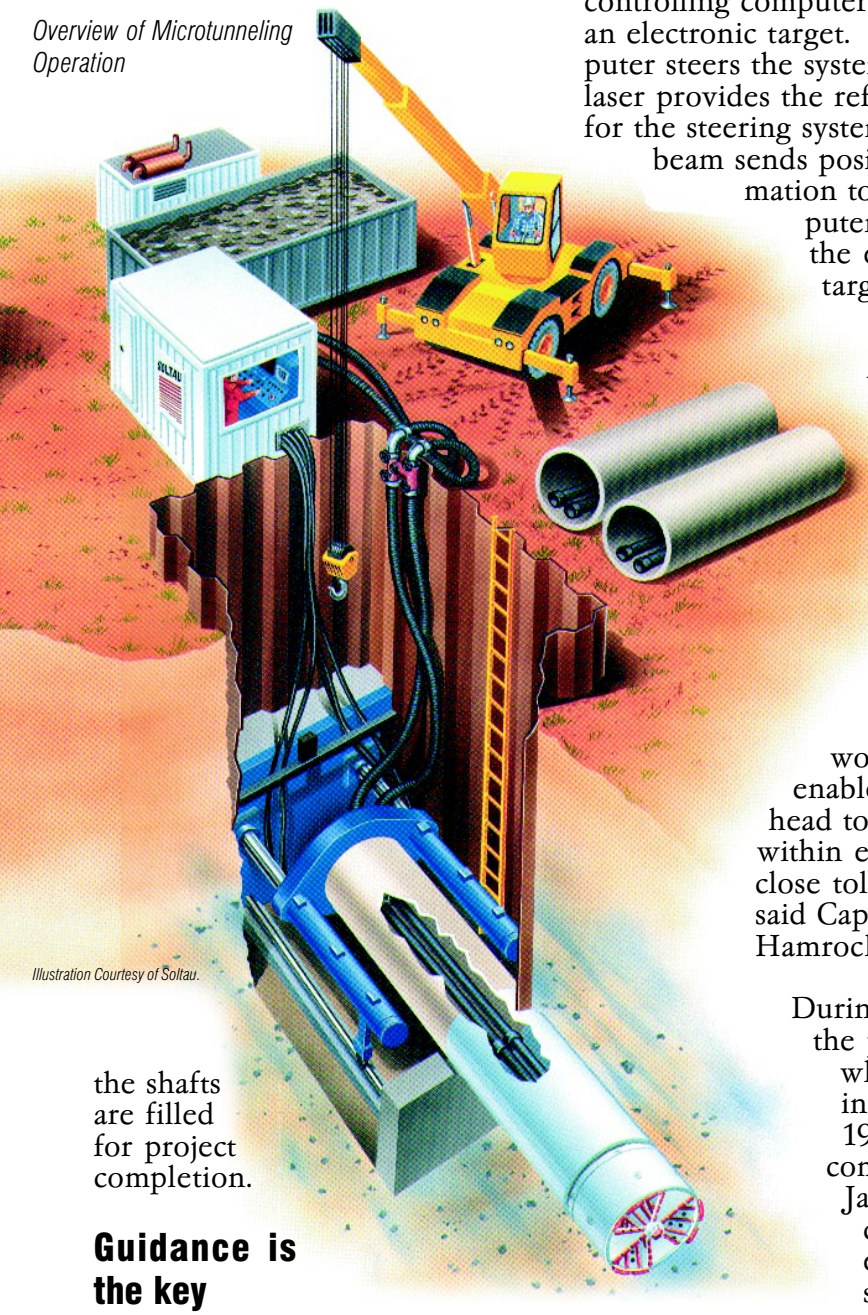


Above, a pipe is installed into the entry shaft, which contains reinforced walls. When placed, the pipe is pushed forward by heavy-duty jacking equipment. Right, workers are shown preparing for coupling of the pipe sections for the microtunneling project at Plant 6.



How it works

Microtunneling uses a specialized cutting head to bore through all types of soil conditions such as sand, gravel and bedrock. The cutting head and pipe travel underground from an initial shaft with reinforced walls, pushed by heavy-duty jacking equipment. Injectors provide the sealant and coating materials as the pipe penetrates the soil. Gravel and soil from the borings are pumped out through a forced water system for later use and disposal. When the target shaft is reached, all equipment but the pipe is removed, and



Overview of Microtunneling Operation

Illustration Courtesy of Soltau.

the shafts are filled for project completion.

Guidance is the key

Based on the plant's terrain — rolling hills with buildings, utilities and roads — microtunneling was the logical choice for the project, according to Captain Hamrock. "Microtunneling was selected for the accuracy of its guidance system, which delivers the cutting head to within one inch of its target destination," he said.

The guidance system comprises three main components: a controlling computer, a laser and an electronic target. The computer steers the system, while the laser provides the reference data for the steering system. The laser beam sends position information to the computer by seeking the electronic target.

"Microtunneling guidance systems are some of the most sophisticated and accurate in the world. They enable the cutter head to work within extremely close tolerances," said Captain Hamrock.

During work on the project, which began in December 1999 and was completed in January 2000, contract engineers started the tunneling operation from a 15-foot deep shaft and microtunneled to the 30-foot deep target shaft. A cast-in-place pipe, 36 inches in diameter, was installed to replace the deteriorated pipeline.

"The installation of sewers and pipelines by microtunneling — as a commercial alternative to the open cut trenching method — is fast becoming an accepted form of construction in the United States," said Roddy Keish, ASC's integrated product team lead for AFP 6.

Saving time and money

By using microtunneling at AFP 6, the Air Force saved more than $300,000 — a reduction of more than 25 percent over conventional costs. In addition, the project took only one month to complete, compared to the standard method, which generally requires two to three months.

By not performing traditional trench construction, the contractor also avoided the excavation, handling and replacement of at least 3,000 cubic yards of soil. What's more, trenching requires construction of trench boxes to prevent walls from caving in and shorings to prevent building foundations from collapsing.

"Since the project worked so well at Plant 6, we will consider using it at other sites. The results have been very encouraging," said Keish.

Multiple benefits

There are many other benefits associated with the use of microtunneling construction, according to industry spokespersons. For instance, it is environmentally friendly, is unobtrusive, minimizes disruption to local residents and traffic, and greatly reduces the risk of damage to private properties. It also is accurate, lowers accident risks and work force requirements and reduces ground destabilization. The final installed pipe is stronger than a standard open cut pipe.

"Microtunneling has worked well in Austria – and it is working just as well north of Atlanta," summed up Captain Hamrock.

Project tests new cleanup method at AFP 44

A compound commonly used in deodorizers, disinfectants and water treatment systems may help to break down contamination trapped underground in clay layers and groundwater.

The purple crystalline substance, called potassium permanganate, is being field-tested this fall at Air Force Plant 44 (AFP 44) in Tucson, Ariz., at two environmental cleanup sites where the solvent trichloroethylene (TCE) is being removed from soil and groundwater. The plant's cleanup program is managed by Aeronautical Systems Center's Acquisition Environmental, Safety and Health Division and involves 12 sites contaminated primarily with TCE and heavy metals.

Engineers from ASC and Raytheon Systems Co., which operates AFP 44, have been working with the University of Arizona in a joint effort to study potassium permanganate and its ability to degrade TCE into harmless substances. It works by boosting oxygen levels in the soil and groundwater, which helps to promote destruction of the TCE without having to pump it out of the ground.

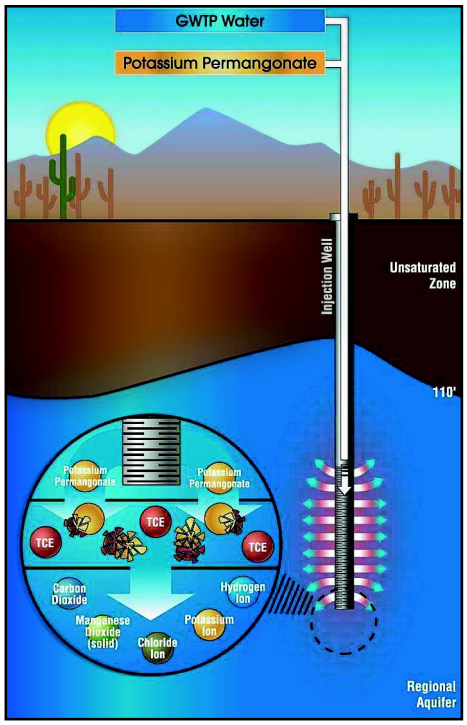
Mat Wallace, a contractor working on the project, conducts a pump test at AFP 44's Site 2 to determine the permeability of the aquifer before injecting the potassium permanganate solution.

In lab studies conducted at the university last winter, a sample of soil from the plant was injected with potassium permanganate. The solution successfully turned the TCE into nontoxic chloride salts and carbon dioxide. Engineers are now field testing the potassium permanganate at cleanup Sites 2 and 3 — where TCE has been difficult to remove from the soils and groundwater using current cleanup equipment.

"These two areas have deep layers of clay and we think the TCE is confined inside the layers — making it immobile and unable to move with the flow of air or groundwater," explained Dennis Scott, AFP 44 integrated product team lead, from the Acquisition Environmental, Safety and Health Division. "We may also have a situation where the TCE is trapped as a liquid — or it might have fused into the soil structure."

According to Scott, a portion of the TCE was removed from the two sites by a technology called soil vapor extraction. This process pulls vapors from the ground using a network of extraction wells, then strips the vapors with special carbon filters. However, because the TCE is confined, contaminant levels remain relatively high there, prompting a look at other technologies. "Potassium permanganate has been tested at other bases with similar challenges – so we want to give it a chance at Air Force Plant 44," Scott said. "It's relatively inexpensive, quick and can destroy the TCE in place instead of having to pump it from the ground."

Before the tests could begin, federal and state environmental regulators were required to approve of the solution's use at AFP 44. Once approved, about 2,500 pounds of potassium permanganate was injected into an existing test well at Site 2, screened from 98 to 118 feet below ground surface. The solution is expected to spread through the clay layer containing the trapped TCE, then move downward to the water table. At Site 3, Scott said the operating extraction wells, normally used to pull contamination from the ground, were temporarily shut down so that roughly 2,000 pounds of the solution could be injected directly into the upper level of the groundwater aquifer. "The solution is expected to slowly migrate through the aquifer and degrade the TCE," he explained.



Potassium permanganate process as it is introduced through an existing injection well. The circle at lower left shows the TCE breakdown process.

The groundwater will be monitored during the field tests to evaluate whether the potassium permanganate has reduced TCE concentrations at the sites. If effective, the AFP 44 team will look at the costs and potential impacts of a full-scale use of the solution to determine the feasibility of implementing the new cleanup method.

- By Larine Barr, ASC Public Affairs

Joint effort reuses Tucson equipment

State-of-the-art equipment used to treat wastewater in Tucson, Ariz., has found a new home in Marietta, Ga. Roughly 10 semi-truck loads of equipment formerly used at Air Force Plant 44 in Tucson were recently shipped by the Aeronautical Systems Center to Air Force Plant 6.

The transfer of equipment signals a positive gain for both plants. Air Force Plant 44 used the equipment in a three-stage filtration process (pressure filter, ultrafiltration and reverse osmosis) to treat industrial wastewater at its treatment plant. However, new wastewater strategies made the reverse osmosis system unnecessary, according to Mark Orton, AFP 44's industrial wastewater treatment supervisor.

"When the Plant 44 reverse osmosis equipment became unnecessary, it was only four years old and — because of Arizona's climate — was in "like-new" condition," said Orton.

Air Force officials learned at the same time that AFP 6 needed to upgrade an existing industrial wastewater treatment plant with reverse osmosis capability, to provide clean water to several aircraft and repair manufacturing operations.

"Two government agencies and eight contractors are participating in this gigantic undertaking."

- Roddy Keish, AFP 6 IPT Lead

"This exchange of equipment provided a win-win situation for both plants. They met and exceeded their goals with this transaction," said ASC's Capt. Thomas Hamrock, safety and health compliance manager for AFP 6. "The Air Force estimates savings of at least two million dollars upon completion of the project."

Disassembly of equipment from AFP 44 was scheduled to take about five weeks, but instead took only three and one-half. AFP 6 received the equipment in May, with placement on newly poured support pads scheduled for this fall. After assembly, engineers will test the equipment, which is estimated to be operational by June 2001.

"Two government agencies and eight contractors are participating in this gigantic undertaking," according to Roddy Keish, ASC's integrated product team lead for AFP 6. He added that, "logistics are being managed by Captain Hamrock from a web-based system at Wright-Patterson Air Force Base."

Two units of the three-stage filtration system used in the reverse osmosis process at AFP 44.

The project is being jointly executed by the Air Force, Savannah Corps of Engineers, Lockheed Martin, IT Corporation, CH2M Hill, Raytheon, Osmonics, Taylor Controls, ALC Controls and Lockwood Greene.

Lockheed Martin Aeronautics Company currently operates wastewater treatment facilities at AFP 6 under a National Pollutant Discharge Elimination System permit issued by the State of Georgia. Approximately two million gallons of water a day is purchased from the Cobb Marietta Water Authority. Of that quantity, about 1.7 million gallons are treated at the on-site wastewater treatment plant. In addition, Lockheed treats wastewater discharged from the Naval Air Station and Dobbins Air Force Base located adjacent to AFP 6.

Based on the results of a recent Wastewater Zero Discharge study, Lockheed plans to reuse treated effluent (clean water) needed for its aircraft repair and manufacturing functions. To meet water quality requirements, AFP 6 will use the reverse osmosis system to further treat and clean the water until it reaches standards acceptable for industrial use.

The two plants are part of the nine remaining government-owned, contractor-operated facilities managed by ASC's Engineering Directorate, Acquisition Environmental, Safety and Health Division.

Air Force Plant 6 opened in 1942, when Bell Aircraft Corporation began production of the B-29 aircraft during World War II. This production ended in 1946, and the plant was used to store machine equipment and tools until 1951. Since then, Lockheed has operated the facility, which employs about 11,000 people. The plant consists of Air Force and Lockheed Martin-owned buildings, covering about eight million square feet of floor space. AFP 6 manufactures and repairs a number of Air Force aircraft, including the C-5, C-130, C-141, F-117 and the new F-22 fighter.

- By Don Yates
ASC Public Affairs

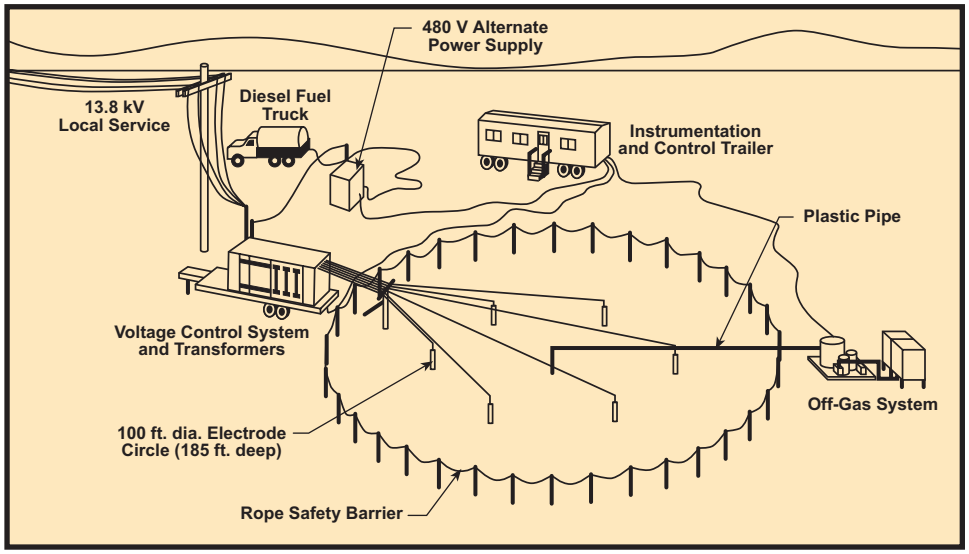
Technology heats soil to enhance cleanup

- By Daniel Johnson, ASC Public Affairs

Cleaning up a contamination site is not a simple task. There is no single answer on what works best. Every area has its own set of contaminants, soil types, geology, and groundwater systems. Each site must be analyzed to determine the most effective cleanup technologies for its unique characteristics.

At Air Force Plant 4 (AFP 4) in Fort Worth, Texas, engineers face similar dilemmas and are on a quest to improve cleanup efficiency at the site. Under a pilot project, six-phase soil heating (SPSH) is being tested to improve a soil-vapor extraction (SVE) system which is removing contamination from under Bldg. 181. The environmental cleanup of the plant is managed by the Acquisition Environmental, Safety and Health Division of Aeronautical Systems Center (ASC) at Wright-Patterson Air Force Base, Ohio.

In July 1999, AFP 4 began operating its new, expanded SVE system as a response to concerns about trichloroethylene (TCE) contamination in the soil under the building. In the SVE system, extraction wells remove TCE-contaminated water and vapor from the ground. A groundwater treatment system eliminates the TCE from the groundwater through air stripping. According to Wayne Lundberg, physical scientist at ASC, the SVE system is working well, but it takes time to see results. "The Six-Phase Soil Heating enhancement will show us if we can be more efficient in getting the job done," he said.



Six-phase soil heating pilot project at Plant 4.

Designed by Battelle Pacific Northwest Laboratory, SPSH works by combining with a proven technology, such as an SVE system, to boost cleanup in difficult conditions. It is especially suited to sites where contaminants are tightly bound in clay layers and are thus difficult to remove using SVE technology alone.

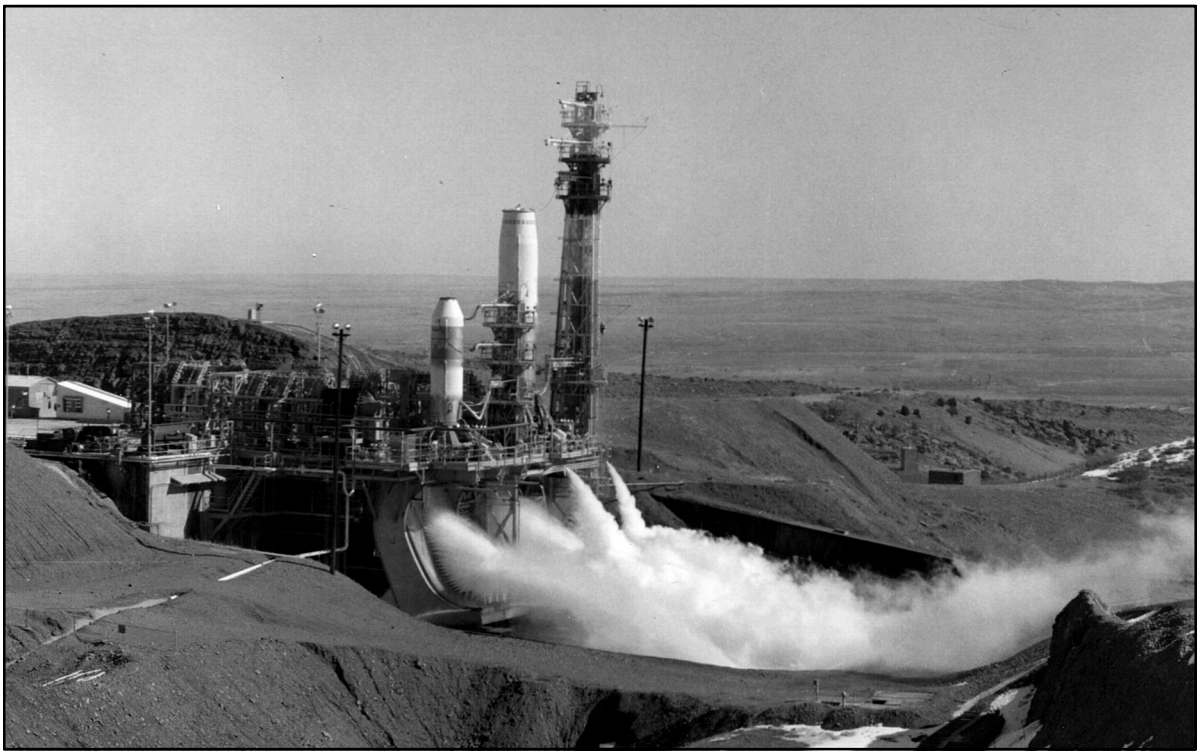
To release the TCE vapors, SPSH raises the temperature of the soil by passing standard electrical current through the soil's moisture. This heating has several impacts on the soil. It increases the ability of TCE to vaporize, and subsequently aids in vapor extraction from the soil. While drying the soil, the heating also creates steam which increases the soil's porosity. Soil porosity allows vapors and liquids to move through it.

The technology uses conventional utility power to heat the soil with six electrodes placed in a hexagonal pattern at the site. A vapor extraction well, located in the center of the hexagon, is used to remove the contaminants, air, and steam.

At Bldg. 181, SPSH is expected to accelerate cleanup of a particularly concentrated amount of TCE, called Dense Non-Aqueous Phase Liquid, or DNAPL. The DNAPL is pooled on top of the limestone bedrock that lies beneath the building and extends under the east parking lot area. The system is designed to work with the SVE system already in place and a pump-and-treat system in the east parking lot.

The pilot test has an ambitious schedule. Construction of the pilot project at Bldg. 181 began in February 2000, and started operating in July. Sampling, data collection and analysis will continue this fall with a final report due late in the year. Lundberg said if the pilot project proves successful, the Air Force will consider building a full-scale system to address the entire DNAPL plume area.

Lundberg added that determining cost savings and reduction in the cleanup schedule is difficult. He expects, however, that SPSH will show a discernible savings in both time and money over using existing technologies alone in reaching cleanup goals. "It's the most effective approach we can get right now. The Interagency DNAPL Consortium recommends SPSH as one of the top three technologies available for treating DNAPL." As the cleanup effort continues at AFP 4, the search will continue for more efficient and more effective methods of reaching Air Force goals.



A Titan missile test firing at AFP PJKS in 1962. A remedial investigation, completed in May 1999, defined the nature and extent of possible contamination resulting from earlier operations at the site.

ASC negotiates sale of Colorado plant

After 43 years of ownership, the Air Force will sell Air Force Plant PJKS (AFP PJKS) to Lockheed Martin this fall.

Operated by Lockheed Martin, the plant is a government-owned, contractor-operated facility located just outside Waterton, Colo., a suburb of Denver. AFP PJKS was named after the construction contractor who built the plant, Peter J. Kiewitt and Sons, and has been on the National Priorities List for cleanup since November 1989. The National Priorities List is the U. S. Environmental Protection Agency's (EPA) accounting of the most serious, uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response or cleanup.

The plant is surrounded by a 4,700-acre facility owned and operated by Lockheed Martin Space Systems Company. Lockheed is responsible for the management and operation of plant activities which have included development and assembly of the Titan I and II missiles, rocket and small engine testing, rocket fuels development, and the Titan III and IV Space Launch Vehicles.

In order to sell the plant, the Air Force entered into a consent decree with Lockheed Martin, which was judicially approved in June 2000. By entering into this consent decree, the United States and Lockheed Martin resolved their respective environmental liability and formulated a plan to work together to continue performing response actions and funding response costs at the site.

The Air Force also has entered into the State Compliance Order with Colorado Department of Public Health and Environment (CDPHE) to perform response actions. The EPA will participate in the site cleanup through its review and comment, according to the Memorandum of Understanding between the CDPHE and the EPA, Region VIII.

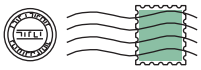
A remedial investigation was completed in May 1999 to determine the nature and extent of contamination. The investigation document is currently being reviewed by the CDPHE. Much of the suspected contamination resulted from accidental spills, runoffs, and past waste disposal practices that, while in compliance at the time, do not meet today's more stringent standards. All of the areas under investigation are contained either within the plant area or within the surrounding Lockheed Martin property. When the remedial investigation is approved by the CDPHE, the actual cleanup process will begin where needed.

The Agency for Toxic Substances and Disease Registry performed a Public Health Assessment for AFP PJKS and published its final report March 29, 2000. The findings indicate that residents near PJKS are not at risk, since the contamination is contained on PJKS and Lockheed Martin properties. The report can be found in the Columbine Public Library at 7706 West Bowles Avenue, in Littleton, Colo.

-By Judy Charles
ASC/ENVR

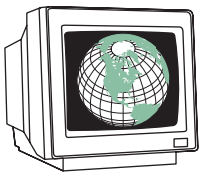
How you can get more information

If you are interested in environmental activities at our Air Force industrial plants, there are several ways to get more information.



Mailing Lists

We maintain community mailing lists for each of our nine Air Force industrial plants. If you, or someone you know, would like to be added to our mailing list, please call our toll-free number listed at the right.



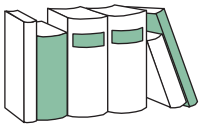
Internet

Our web site at **http://www.ascenv.wpafb.af.mil** includes information about our organization. Find out more about our pollution prevention, compliance, restoration, and safety and health programs. The site also details ongoing restoration activities at each plant. Or, e-mail our staff at:

larine.barr@wpafb.af.mil
daniel.johnson@wpafb.af.mil
donald.yates@wpafb.af.mil

Contact Numbers.

To contact one of our public affairs specialists, call our toll-free number at (800) 982-7248. Extensions include: Larine Barr, ext. 322; Daniel Johnson, ext. 346; and Don Yates, ext. 301.



Administrative Record/ Information Repository

The Air Force maintains an Administrative Record for each Air Force plant at Wright-Patterson Air Force Base in Dayton, Ohio. The record contains documents on cleanup efforts and is available to the public for review. The Air Force also maintains an information repository, located at public libraries near each plant, which contains information pertinent to the cleanup effort, as well as related material.

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Stateside SENTINEL